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EXAMINER	
MISLEH, JUSTIN P	

ART UNIT	PAPER NUMBER
2612	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/768,500	TAKAHASHI ET AL.	
	Examiner	Art Unit	
	Justin P Misleh	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19 - 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *29 and 33/29* is/are allowed.

6)☒ Claim(s) *19 - 28, 30 - 32, 33/19, 33/26, 33/30, and 33/32* is/are rejected.

7)☒ Claim(s) *25,28 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 September 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/20/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 20 September 2004, with respect to new independent **Claims 19 and 25** have been fully considered but they are not persuasive.

2. Applicant's arguments with respect to new independent **Claims 26, 30, and 32** have been considered but are moot in view of the new grounds of rejection.

3. In view of Applicant's amendments there are no further objections to the specification. However, Applicant's amendment did not correct all objections to the drawings. More specifically, the Replacement Sheet for figure 10 shows reference sign 6 as the substrate wherein reference sign 6 is also the color filter in other figures.

In regards to new independent Claims 19 and 25

The Applicant states that the features of Claims 19 and 25 correspond to figures 4 and 6 and various portions of the specification on pages 11 – 13 and that the prior art fails to disclose those features. While the Examiner agrees that Claims 19 and 25 correspond to the embodiments of figure 4 and 6, the Examiner believes that the features of those claims are anticipated by the prior art.

Turning to the first embodiment, as described in figures 4A and 4B and page 10 (line 24) – 11 (line 3) of the specification, "the pixel (1) disposed nearer to the peripheral area than the center of the pixel group has a center of gravity of the light reception area of the photodiode (5)

positioned nearer to the peripheral area than the centers of gravity of the microlens (4) and opening area (3)."

In other words, figure 4B shows that in the peripheral areas the photodiodes (5) and the opening areas (3) are not aligned. As stated in Claim 25, "the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses and the opening areas are shifted toward the center of the pixel group more than the corresponding photoelectric conversion elements."

The Examiner believes Yamaguchi et al. successfully anticipates Claim 25 because as shown in figures 2, 3A, 3B, and 3C, in the peripheral areas (figures 3A and 3C), the opening areas in light shield (26) are not aligned with the photodiodes (22) and the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas (of the light shield 26) are shifted toward the center of the pixel group (figure 3B) more than the corresponding photoelectric conversion elements (22). In conclusion, figures 2, 3A, 3B, and 3C of Yamaguchi et al. directly correspond to Applicant's figures 4A and 4B.

Turning to the second embodiment, as described in figures 6A and 6B and page 12 (lines 22 – 27) of the specification, "the pixel (1) disposed nearer to the peripheral area than the center of the pixel group has a center of gravity of the light reception area of the photodiode (5) positioned nearer to the peripheral area than the centers of gravity of the microlens (4)."

In other words, figure 6B shows that in the peripheral areas the photodiodes (5) and the opening areas (3) are aligned. As stated in Claim 19, "a pixel positioned in an outer area of a

group of said pixels is arranged so that a center of gravity of the opening area is shifted outward with respect to a center of gravity of the converging lens."

The Examiner believes Asai et al. successfully anticipates Claim 19 because as shown in figures 7A and 7B, in the peripheral areas (figures 7B), the opening areas (37a) in light shield (37) are aligned with the photodiodes (25) and a pixel positioned in an outer area of a group of said pixels (figure 7B) is arranged so that a center of gravity of the opening area (37a) is shifted outward with respect to a center of gravity of the converging lens (45). In conclusion, figures 7A and 7B of Asai et al. directly correspond to Applicant's figures 6A and 6B.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "6" has been used to designate both a color filter (Replacement figure 1B) and substrate (Replacement figure 10).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the Examiner, the Applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. **Claims 25, 28, and 30** are objected to because of the following informalities: minor typographical errors.

6. **Claim 25** recites therein, "the photoelectric conversion element;" however, a "photoelectric conversion element" has not previously been introduced. To alleviate a portion of the objection, the Examiner recommends changing the "pixel group" limitation to recite: a pixel group including a plurality of pixels each includes a photoelectric conversion element for converting the incident light from the converging lens into an electric signal.

Furthermore, Claim 25 recites therein, "and a center of gravity of the opening area are shifted toward the peripheral [less] than the corresponding photoelectric elements." The Examiner believes the Applicant, as designated within the brackets inadvertently left out the word "less". The Examiner's interpretation is based upon figure 4B to which the claim language is directed. Lastly, these statements are equally applicable to **Claim 28**.

7. **Claim 30** recites therein, "microlenses for converging light, formed on a layer evened by a CMP process and arranged between an image pickup lens the photoelectric conversion areas correspondingly to the photoelectric conversion areas respectively." The Examiner believes the above recitation presents a typographical because it does not state what exactly the "microlenses" are between. For the purposes of examination, the above recitation will be interpreted as follows: microlenses for converging light, formed on a layer evened by a CMP process, and correspondingly arranged to each of the photoelectric conversion areas respectively.

8. Appropriate correction is required.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. **Claims 19 – 23 and 33/19** are rejected under 35 U.S.C. 102(b) as being anticipated by Asai et al.

11. For **Claim 19**, Asai et al. disclose, as shown in figures 7A and 7B and as stated in column 4 (lines 30 – 62), a solid-state image pickup apparatus comprising a plurality of pixels each of which includes a converging lens (on-chip lens 45) for converging incident light thereinto, a photoelectric conversion element (sensor 25) for converting the light converged by the converging lens (on-chip lens 45) into an electric signal, and a light-shielding layer (light-shielding film 37) including an opening area (opening 37a) through which the converged light is coupled to the photoelectric conversion element (sensor 25) and a light-shielding area for shielding an area (pixel separation portion 31 and 27) other than the photoelectric conversion element (sensor 25) from light, wherein a said pixel positioned in an outer area (peripheral portion corresponding to figure 7B) of a group of said pixels is arranged so that a center of gravity of the opening area (opening 37a) is shifted outward (see incident angle of light 46) with respect to a center of gravity of the converging lens (on-chip lens 45), and

wherein each of the plurality of pixels has a structure so that an optical axis (see incident angle of light 46) of the converged light passes through a center of gravity of a light-receiving surface of the photoelectric conversion element (sensor 25) and also passes through the center of gravity of the opening area (opening area 37a) included in the light-shielding layer (light-shielding film 37).

As shown in figures 7A and 7B, in the peripheral areas (figures 7B), the opening areas (37a) in light shield (37) are aligned with the photodiodes (25) and a pixel positioned in an outer area of a group of said pixels (figure 7B) is arranged so that a center of gravity of the opening area (37a) is shifted outward with respect to a center of gravity of the converging lens (45).

12. As for **Claim 20**, Asai et al. disclose, as stated in column 4 (lines 43 and 44), that the displacement amounts increase toward the peripheral portion. Thus, Asai et al. disclose wherein the plurality of pixels are arranged so that at the more outer position in the pixel group the pixel is positioned, the more the center of gravity of the light-receiving surface of the photoelectric conversion element (25) is shifted in a direction opposite to the center of the pixel group than the converging lens (45).

13. As for **Claim 21**, Asai et al. disclose, as shown in figure 7, further comprising a color filter layer (43) arranged on an optical path of the converged light.

14. As for **Claim 22**, Asai et al. disclose, as shown in figure 7, further comprising a filter layer (44, 43, 42, 41, 37) including an opening area (37a) through which the converged light is incident onto the photoelectric conversion element (25), and a light-shielding area (37) for shielding, from light, an area where the converging lens (45) is not arranged, wherein each of the

plurality of pixels is arranged so that an optical axis of the converged light passes through a center of gravity of the opening area (37a) of the filter layer.

15. As for **Claim 23**, Asai et al. disclose, as shown in figure 8, wherein the pixel group is formed by one or two-dimensional arrangement of the plurality of pixels.

16. As for **Claim 33/19**, Asai et al. disclose, as shown in figure 2, a lens (13) for focusing light onto the solid-state image pickup apparatus; and a signal processing portion (16) which processes a signal from the solid-state image pickup apparatus.

17. **Claims 25, 32, and 33/32** are rejected under 35 U.S.C. 102(e) as being anticipated by Yamaguchi et al.

18. For **Claim 25** (please see objection above), Yamaguchi et al. disclose, as shown in figures 2, 3A, 3B, and 3C and as stated in columns 5 (lines 54 – 67) and 6 (lines 1 – 37), a solid-state image pickup apparatus comprising:

a plurality of converging lenses (27) for converging incident light thereinto;

a pixel group (see center and peripheral portions of figure 2) including a plurality of pixels each of which includes a photoelectric conversion element (22) for converting incident light from the converging lens (27) into an electric signal; and

a plurality of opening areas (opening areas in metal shield 26) through each of which the light from the converging lens (27) is coupled to the photoelectric conversion element (22), wherein at least the pixels positioned at peripheral positions (peripheral portion of figure 2 and figures 3A and 3C) of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas are shifted (clearly shown in figure 2) toward the center (center portion of

figure 2 and figure 3B) of the pixel group more than the corresponding photoelectric conversion elements (22), and a center of gravity of the opening areas are shifted (clearly shown in figure 2) toward the peripheral portion less than the corresponding photoelectric conversion elements (22), and

wherein each of the plurality of pixels has a structure so that an optical axis of the light incident from the converging lens (27) passes through a center of gravity of a light-receiving surface of the photoelectric conversion element (22) and a center of gravity of the opening area (opening area of metal shield 26).

As shown in figures 2, 3A, 3B, and 3C, in the peripheral areas (figures 3A and 3C), the opening areas in light shield (26) are not aligned with the photodiodes (22) and the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas (of the light shield 26) are shifted toward the center of the pixel group (figure 3B) more than the corresponding photoelectric conversion elements (22).

19. For **Claim 32**, Yamaguchi et al. disclose, as shown in figures 2, 3A, 3B, and 3C and as stated in columns 5 (lines 54 – 67) and 6 (lines 1 – 37), a solid-state image pickup apparatus comprising:

an image pickup area (see figures 2, 3A, 3B, and 3C) including photoelectric conversion areas (22) arranged two-dimensionally;

microlenses fro converging light, arranged between an image pickup lens (77; see figure 7 and column 9 (lines 3 – 9) and the photoelectric conversion areas (22) correspondingly to the photoelectric conversion areas (22) respectively; and

opening portions (openings between the metal shield 26) provided correspondingly to the photoelectric conversion areas (22) respectively, through each of which the light is incident onto the corresponding photoelectric conversion area (22),

wherein in a peripheral area (peripheral portion of figure 2 and figures 3A and 3C) of the image pickup area, positions of the microlenses (27) and the opening portions are shifted toward the center of each of plurality of image pickup areas more than the corresponding photoelectric conversion areas (22; clearly shown in figure 2) and a pitch of the microlenses (27) in a first area (center portion of figure 2) which includes a plurality of microlenses is different from that in a second area (peripheral portion of figure 2) which is different from the first area and includes a plurality of microlenses.

As shown in figures 2, 3A, 3B, and 3C, in the peripheral areas (figures 3A and 3C), the opening areas in light shield (26) are not aligned with the photodiodes (22) and the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas (of the light shield 26) are shifted toward the center of the pixel group (figure 3B) more than the corresponding photoelectric conversion elements (22).

20. As for **Claim 33/32**, Yamaguchi et al. disclose, as shown in figure 7 and as stated in column 9 (lines 3 – 9), a lens (77) for focusing light onto the solid-state image pickup apparatus. While Yamaguchi et al. disclose that the solid-state image pickup apparatus is for use in an electronic camera, Yamaguchi et al. is silent with respect to a signal processing portion. However, it is inherent to all electronic cameras to have a signal processing portion which

processes a signal from the solid-state image pickup apparatus, otherwise, no electronic image would be formed.

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

22. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over Asai et al. in view of Martin.

23. As for **Claim 24**, while Asai et al. disclose wherein the pixel group is formed by one or two-dimensional arrangement of the plurality of pixels; Asai et al. do not disclose wherein the pixel group is formed by a curved arrangement of the plurality of pixels.

On the other hand, Martin also discloses a solid-state image pickup apparatus including a pixel group. More specifically, Martin teach, as shown in figure 7 and as stated in column 8 (lines 43 – 47), wherein the pixel group is from by a curved arrangement of the plurality of pixels.

As stated in column 8 (lines 43 – 47), at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have included the curved pixel arrangement taught by Martin in the solid-state image pickup apparatus disclosed by Asai et al. for the advantage of removing lens distortion from an image.

24. **Claims 26, 27, 28, and 33/26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyers in view of Yamaguchi et al.

25. For **Claim 26**, Meyers discloses, as shown in figure 1A and as stated in column 4 (lines 27 – 47), solid-state image pickup apparatus comprising:

a plurality of image pickup areas (sub-group of photodetectors 22) each of which includes photoelectric conversion areas (photodetector elements 24) arranged two-dimensionally (10x10); and image pickup lenses (lenslets 12) provided corresponding to the plurality of image pickup areas (each lenslet 12 corresponds to a single image pickup area 22) respectively.

While Meyers discloses a plurality of image pickup areas and image pickup lenses for each of image pickup areas, Meyers does not disclose microlenses corresponding to the photoelectric conversion areas respectively, each of which is arranged between the image pickup lenses and the corresponding photoelectric conversion areas to converge light; and opening portions provided correspondingly to the photoelectric conversion areas respectively, through each of which the light is incident onto the corresponding photoelectric conversion area, wherein in a peripheral area of each of plurality of image pickup areas, positions of the microlenses and the opening portions are shifted toward the center of each of plurality of image pickup areas more than the corresponding photoelectric conversion areas.

On the other hand, Yamaguchi et al. also disclose a solid-state image pickup apparatus including an image pickup area. More specifically, Yamaguchi et al. disclose, as shown in figures 2, 3A, 3B, and 3C and as stated in columns 5 (lines 54 – 67) and 6 (lines 1 – 37), a solid-state image pickup apparatus comprising:

an image pickup area (see figures 2, 3A, 3B, and 3C);

microlenses (27) corresponding to photoelectric conversion areas (22) respectively; and

opening portions (openings between the metal shield 26) provided correspondingly to the photoelectric conversion areas (22) respectively, through each of which the light is incident onto the corresponding photoelectric conversion area (22), wherein in a peripheral area (peripheral portion of figure 2 and figures 3A and 3C) of the image pickup area, positions of the microlenses (27) and the opening portions are shifted toward the center of each of plurality of image pickup areas more than the corresponding photoelectric conversion areas (22; clearly shown in figure 2).

As shown in figures 2, 3A, 3B, and 3C, in the peripheral areas (figures 3A and 3C), the opening areas in light shield (26) are not aligned with the photodiodes (22) and the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas (of the light shield 26) are shifted toward the center of the pixel group (figure 3B) more than the corresponding photoelectric conversion elements (22).

In conclusion, as stated in column 2 (lines 6 – 15) of Yamaguchi et al., at the time the invention was made, it would have been obvious to one with ordinary skill in the art to have replaced the image pickup areas disclosed by Meyers with the image pickup areas taught by Yamaguchi et al. for the advantage of providing a reduction of light sensitivity in the peripheral portions of image pickup areas.

26. As for **Claims 27 and 28**, Yamaguchi et al. disclose, as shown in figures 2, 3A, 3B, and 3C, in the peripheral areas (figures 3A and 3C), the opening areas in light shield (26) are not aligned with the photodiodes (22) and the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas (of the

light shield 26) are shifted toward the center of the pixel group (figure 3B) more than the corresponding photoelectric conversion elements (22). In other words, Yamaguchi et al. disclose wherein the center of the microlens and the center of the corresponding opening portion are substantially concentric with each other.

27. As for **Claim 33/26**, Yamaguchi et al. disclose, as shown in figure 7 and as stated in column 9 (lines 3 – 9), a lens (77) for focusing light onto the solid-state image pickup apparatus. While Yamaguchi et al. disclose that the solid-state image pickup apparatus is for use in an electronic camera, Yamaguchi et al. is silent with respect to a signal processing portion. However, it is inherent to all electronic cameras to have a signal processing portion which processes a signal from the solid-state image pickup apparatus, otherwise, no electronic image would be formed.

28. **Claims 30, 31, and 33/30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al.

29. For **Claim 30** (please see objection above), Yamaguchi et al. disclose, as shown in figures 2, 3A, 3B, and 3C and as stated in columns 5 (lines 54 – 67) and 6 (lines 1 – 37), a solid-state image pickup apparatus comprising:

an image pickup area (see figures 2, 3A, 3B, and 3C) including photoelectric conversion areas (22) arranged two-dimensionally;

microlenses (27) for converging light, formed on a layer (24), and correspondingly arranged to each of the photoelectric conversion areas (22) respectively; and

opening portions (openings between the metal shield 26) provided correspondingly to the photoelectric conversion areas (22) respectively, through each of which the light is incident onto the corresponding photoelectric conversion area (22),

wherein in a peripheral area (peripheral portion of figure 2 and figures 3A and 3C) of the image pickup area, positions of the microlenses (27) and the opening portions are shifted toward the center of each of plurality of image pickup areas more than the corresponding photoelectric conversion areas (22; clearly shown in figure 2).

As shown in figures 2, 3A, 3B, and 3C, in the peripheral areas (figures 3A and 3C), the opening areas in light shield (26) are not aligned with the photodiodes (22) and the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas (of the light shield 26) are shifted toward the center of the pixel group (figure 3B) more than the corresponding photoelectric conversion elements (22).

As stated in column 2 (lines 54 – 65), reference signs 23 and 24 represents flattening layers (insulation films) and/or color filters. Yamaguchi et al. do not specifically disclose the manufacturing technique; however does state, in column 7 (lines 20 – 24), that the flattening layers are fabricated using a "conventional method".

A conventional method for fabricating flattening layers is Chemical Mechanical Polishing (CMP). Chemical Mechanical Polishing (an older terminology) or rather Chemical Mechanical Planarization is a process whereby a chemical reaction increases the mechanical removal rate of a material. CMP is commonly used to polish off high spots on wafers or films deposited on wafers, flattening the film or wafer, referred to as planarization. The chemical

reaction that increases the mechanical removal rate is commonly tailored to provide a higher removal rate of one material versus another material. The chemical action in CMP helps to achieve higher selectivity's of one material to another than a strictly mechanical process would provide.

Therefore, **Official Notice** is taken that both the concepts and the advantages of using a CMP process to form a flattening/evening layer are well known and expected in the art. At the time the invention as made, it would have been obvious to one with ordinary skill in the art have formed the flattening/evening layer by a CMP process as a means to ensure a constant depth of focus within the substrate and to increase the reliability of the chip by preventing an unduly thinning of the wiring patterns cause by uneven layers.

30. As for **Claim 31**, Yamaguchi et al. disclose, as shown in figures 2, 3A, 3B, and 3C, in the peripheral areas (figures 3A and 3C), the opening areas in light shield (26) are not aligned with the photodiodes (22) and the pixels positioned at peripheral positions of the pixel group are arranged so that positions of the converging lenses (27) and the opening areas (of the light shield 26) are shifted toward the center of the pixel group (figure 3B) more than the corresponding photoelectric conversion elements (22). In other words, Yamaguchi et al. disclose wherein the center of the microlens and the center of the corresponding opening portion are substantially concentric with each other.

31. As for **Claim 33/30**, Yamaguchi et al. disclose, as shown in figure 7 and as stated in column 9 (lines 3 – 9), a lens (77) for focusing light onto the solid-state image pickup apparatus. While Yamaguchi et al. disclose that the solid-state image pickup apparatus is for use in an electronic camera, Yamaguchi et al. is silent with respect to a signal processing portion.

However, it is inherent to all electronic cameras to have a signal processing portion which processes a signal from the solid-state image pickup apparatus, otherwise, no electronic image would be formed.

Allowable Subject Matter

32. **Claims 29 and 33/29** are allowed.

33. The following is a statement of reasons for the indication of allowable subject matter:

The closest prior art teaches a solid-state image pickup apparatus comprising: a plurality of image pickup areas each of which includes photoelectric conversion areas arranged two-dimensionally; image pickup lenses provided correspondingly to the plurality of image pickup areas respectively; microlenses for converging light, arranged between the image pickup lenses and the photoelectric conversion areas correspondingly to the photoelectric conversion areas respectively; and opening portions provided correspondingly to the photoelectric conversion areas respectively, through each of which the light is incident onto the corresponding photoelectric conversion area, wherein color filters of a same color are arranged in each of the plurality of image pickup areas so that the color filters of different three colors are arranged in the plurality of image pickup areas respectively, wherein in a peripheral area of each of the plurality of image pickup areas, positions of the microlenses and the opening portions are shifted toward the center of each image pickup area more than the corresponding photoelectric conversion areas; however, the closest prior art does not teach or fairly suggest wherein shift amounts of microlenses with respect to the corresponding photoelectric conversions areas differs

between at least two of the plurality of image pickup areas wherein the color filters of the different colors are arranged respectively.

Cited Prior Art

34. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

- Kato (US 5,682,203) teaches of a solid-state image sensing device including a plurality of photo cells provided on a substrate and a plurality of micro condenser members each provided on a corresponding photo cell, wherein the interval at which the micro condenser members are arranged at a central portion of the substrate differs from the interval at which the micro condenser members are arranged at a peripheral portion.

Conclusion

35. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

36. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Justin P Misleh whose telephone number is 703.305.8090 (571.272.7313 ~ March 2005). The Examiner can normally be reached on Monday through Thursday from 7:30 AM to 5:30 PM and on alternating Fridays from 7:30 AM to 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wendy R Garber can be reached on 703.305.4929. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
January 24, 2005

TUAN HO
PRIMARY EXAMINER